other two times a square. Being known *one* of the values of n in $\frac{n(n+1)}{2}=\square$, the value next succeeding as well as the value just preceding can be found by the following formula which I deduced by inspection:

$$\frac{n(n+1)}{2}=\left(2n_1+1\pm3\sqrt{\frac{n_1(n_1+1)}{2}}\right)^2$$

in which n_1 is a known value of n. By inspection we find that when $n=1$, $\frac{n(n+1)}{2}=\square=1^2$. Now put $n_1=1$, and substituting in the formula, we obtain $\frac{n(n+1)}{2}=6^2$ or 0^2, 6^2 being the $\square$ next succeeding and 0^2 the square just preceding 1^2. From $\frac{n(n+1)}{2}=6^2$, we obtain $n=8(=2\times2^2)$, or $-9(=-3^2)$, and $n+1=9(=3^2)$ or $-8(=-2\times2^2)$. Now put $n_1=8$, and substituting in the formula, we get $\frac{n(n+1)}{2}=(35)^2$ or $(-1)^2$, the positive value being the next succeeding square and the negative value the one just preceding, the latter being the square with which we started. From $\frac{n(n+1)}{2}=35^2$, we find $n=49$ or -50, and $n+1=50$ or -49. By continuing this process, we find the first six positive integral values of n in $\frac{n(n+1)}{2}=\square$, to be 1, 8, 49, 288, 1681, and 9800.

IV. Solution by BENJ. F. YANNEY, A. M., Professor of Mathematics, Mount Union College, Alliance, O.

Let $n=p^2$ or p^2-1, since it must be a perfect power, or a perfect power less 1. Then $\frac{n(n+1)}{2}=\frac{p^2(p^2\pm1)}{2}=a^2$; whence, $p^2\pm1=\frac{2a^2}{p^2}=2q^2$ ......(1).

Adding $2q^2+4pq+p^2$ to each member of equation (1), we have,

$2q^2+4pq+2p^2\pm1=4q^2+4pq+p^2$; or $(2q+p)^2\pm1=2(q+p)^2$..............(2).

Since equations (1) and (2) are the same in form, if we find one set of integral values for p and q in (1), we can then readily find succeeding values by (2). Now, for $p=1$, $q=1$. $\therefore$ Other values are: 3 and 2; 7 and 5; 17 and 12; 41 and 29; 99 and 70; and so on. Then by formula $\frac{n(n+1)}{2}=\frac{p^2(p^2\pm1)}{2}$, the first positive integral values of n are found to be 1, 8, 49, 288, 1691, 9800.

Also solved by *J. H. DRUMMOND, C. D. SCHMITT, H. C. WILKES, G. B. M. ZERR*, and the *PROPOSER*.

ERRATA. On page 368 of December issue, line 4, for "(10+2)" read (10^m+2); line 9, at end, for "B^2" read B_1^2; line 12, for "B^2" read B_1^2, and for

"$(B+1+A_1)$" read $(B+1-A_1)$; line 19, for "hypothenuse" read hypotenuse; line 22, leave out comma after 6; line 26, for "p, b, d," read p, d, b,; line 30, for "13, 14, 15," read 13, 15, 14; page 369, line 8, for "from" read for; line 25, for "the" read their; line 35, for "$a^{mn}+1$" read a^m+1; page 370, line 2, insert a comma before the sign of equality; and credit J. H. Drummond with a solution of No. 32.

NOTES, CRITICISMS, ETC., BY ARTEMUS MARTIN, LL. D.

On page 285 Mr. Adcock gives "An Equation for the sum of Squares equal a Square" which he says he has not seen published. I used the same method in the *Mathematical Magazine*, Vol. II., page 71, to find *three* square numbers whose sum is a square; and in a paper I had read at the last meeting of the American Association for the Advancement of Science I found in the same way *four* squares whose sum is a square. It is easily seen that the formula may be extended so as to find any number of squares whose sum is a square.

Note on Solutions of Problem 27, pp. 329-331.—In the *Mathematical Magazine*, Vol. II., No. 9, page 157, I have given a general method of finding any number (greater than two) of positive cube numbers whose sum is a cube, and on page 158 applied it to the case of five cubes, obtaining the set

$$6^3+11^3+13^3+18^3+20^3=26^3.$$

In Problem 42, p. 332, "$2a^2+2b^2-c^2+d^2$" should be $2a^2+2b^2=c^2+d^2$.

PROBLEMS.

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45. Proposed by J. K. ELLWOOD, A. M., Principal of Colfax School, Pittsburg, Penn.

Solve the equation $x^3+y^2=a^2$.

46. Proposed by JOSIAH H. DRUMMOND, LL. D., Portland, Maine.

Give a general solution, finding such values of a and b in $x^2+x\sqrt{xy}=a$ and $y^2+y\sqrt{xy}=b$ as will make x and y integral.